



The wind profile up to 600 meters at a flat coastal site; Comparison between WRF modeling and lidar measurements

Gryning, Sven-Erik; Batchvarova, Ekaterina; Floors, Rogier; Pena Diaz, Alfredo; Mikkelsen, Torben

Published in:

Proceedings of EWEA 2012 - European Wind Energy Conference & Exhibition

Publication date:

2012

Document Version

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Gryning, S-E., Batchvarova, E., Floors, R., Pena Diaz, A., & Mikkelsen, T. (2012). The wind profile up to 600 meters at a flat coastal site; Comparison between WRF modeling and lidar measurements. In *Proceedings of EWEA 2012 - European Wind Energy Conference & Exhibition* European Wind Energy Association (EWEA).

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

ABSTRACT ID: 518

Theme: RESOURCE ASSESSMENT Topic: Advances in measuring techniques for resource assessment

THE WIND PROFILE UP TO 600 METERS AT A FLAT COASTAL SITE; COMPARISON BETWEEN WRF MODELING AND LIDAR MEASUREMENTS

Sven-Erik Gryning(1) (F) (P) Ekaterina Batchvarova(2) Rogier Floors(1) Alfredo Peña(1) Torben Mikkelsen(1)

(1) Technical University of Denmark, Roskilde, (2) NIMH, Sofia, Bulgaria

Introduction

Approach

Main body of abstract

In order to map the wind field resource by use of numerical modeling as well as for short term forecasts, knowledge on the accuracy of the modeled wind speed at hub height is essential. Currently, mesoscale models are still representing best the surface parameters (mean temperature at 2 meter), while a number of applications (like air pollution and wind energy) need accurate wind profiles and boundary-layer heights. This study shows long-term ABL wind profile features by comparing long-range wind lidar measurements and the output from a mesoscale model. The study is based on one-year pulsed lidar (Wind Cube 70) measurements of wind speed and direction from 100 to 600 meters with vertical resolution of 50 meters and time resolution of 10 minutes at a coastal site on the West coast of Denmark and WRF ARW (NCAR) simulations for the same period. The model evaluation is performed based on wind speed as well as statistical parameters of the Weibull distribution of the wind speed time series as function of height. It is found that 1) the scatter of observations to model results of the wind speed does not change significantly with height between 100 and 600 meters; and 2) WRF is generally under predicting both the profiles of the measured wind speed and power density as well as 3) the scale (A) and shape parameter (k) of the Weibull distribution above 100 m. The latter signifies that the model suggests a wider distribution in the wind speed compared to measurements.

Conclusion